Study offers historic buildings protection from climate change

August 23 2010

Some of the nation's most historic buildings and monuments may be better protected from decay in future, following a development by engineers.

Researchers at the University of Edinburgh have devised a method of forecasting damage caused by the weather to stone buildings - including statues, monuments and other historic sites, as well as modern masonry buildings.

The development allows conservationists to estimate the likely impact of long-term climate change on stonework and brickwork to determine the most suitable plan for preservation.

Studies show that a changing climate could have a significant impact on the deterioration of stone and brick buildings.

Building deterioration is often caused by water from the ground rising up through the stone. As water evaporates, salts are left behind which crystallise at the surface. Damage can also be caused by the physical impact of ice forming and melting during cold weather.

Climate change is expected to lead to higher temperatures and lower humidity, which would increase the rate of water evaporation from stone buildings and subsequent deterioration. Damage that would take hundreds of years under present conditions could be significantly accelerated.

Weathering damage can cause disfigurement to monuments and buildings and lead to crumbling or collapse. Increased rates of damage are likely to impact on maintenance costs.

The study, the first of its kind, created computer models of water movement in stone, based on data from previous studies. The research, carried out as part of a Leverhulme Trust-funded project led by the University of Oxford, was published in *Proceedings of the Royal Society A*.

Dr Andrea Hamilton of the University's School of Engineering, who co-led the study, said: "This research allows us to predict the effect of climate change on water movement through buildings, enabling engineers to decide on the most appropriate method of preservation in the years ahead."

Professor Chris Hall of the University of Edinburgh's School of Engineering, who also co-led the study, said: "The work shows for the first time the critical importance of evaporation in driving the flow of water through masonry structures."

Provided by University of Edinburgh